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### Community seed banks and empowering tribal communities in the Kolli Hills

*E. D. Israel Oliver King, N. Kumar  
and Stefano Padulosi*

Agrarian tribal communities engage in many practices related to the production, selection, storage and exchange of seeds in their subsistence farming. These practices have been evolving since time immemorial and are the backbone of the traditional farming systems of small and marginal farmers in the hill regions even today. They have helped farm families cope with the vagaries of monsoon and weather changes. Local seed systems that are self-sufficient enable community members to find seeds even in times of crisis. Their contribution to the maintenance of crop diversity on farm and diversified livelihood options is invaluable. However, these best practices have begun to decline over the last three decades because of farmers' increasing use of commercial crops.

The Kolli Hills in Tamil Nadu, South India (78° 17' 05' to 78° 27' 45' E and 11° 55' 05' to 11° 21' 10' N) are low-ranging hills spread over an area of 441.41km<sup>2</sup>. The area is inhabited by a homogenous group of tribal people known as the Malayali Gounders, who have maintained inter- and intra-specific minor millet diversity on farm through a set of practices based on the local environmental and social conditions. Currently, 21 landraces of finger millet (seven), little millet (seven), Italian millet (five), common millet (one) and kodo millet (one) are being cultivated by these communities under various agro-ecological conditions.

The introduction of high-yielding varieties and commercial crops has affected the availability of seeds of traditional cultivars of millets. Adoption of cash crops and associated agricultural practices has, in fact, weakened dependence on community-based seed systems. This has led, in turn, to a decrease in the portfolio of diversity-based on-farm options with repercussions for the food and nutritional security of people.

In this context, strengthening access to and availability of traditional varieties is a key intervention in support of local communities. To that end, the community-based seed bank networks, which have been facilitated by the M. S. Swaminathan Research Foundation (MSSRF) in Kolli Hills represent an effective contribution that helped halt the erosion of indigenous crop diversity and strengthen the livelihoods and resilience of the local community.

## **Motivation and objectives**

In 1997, the MSSRF initiated a programme to conserve small millets in Kolli Hills (MSSRF, 2002). At that time, conventional seed sharing was weak and took place at the individual level. As a first step, MSSRF began to identify the 'knowledge holders' and 'seed keepers' of the millet landraces to establish contact and share knowledge about millets and millet farming practices. A core group of 35 traditional millet farmers, both men and women, were motivated to establish community seed banks to ensure the sustainable supply of required seeds of local landraces; serve as a community-based ex-situ conservation facility and as a backup source of seed; enhance availability, use and enhancement of locally adapted seeds; and emerge as a seed and knowledge exchange network managed by a group of tribal people by institutionalizing the community seed bank as a common resource.

## **First steps**

Participatory research appraisal conducted with farmers in various parts of the Kolli Hills revealed that intra-specific landraces were grown in different zones. Also, there was an extreme shortage of the seeds of some varieties and most had been mixed with others under the traditional method of farming.

A core group of millet farmers was trained by the MSSRF in the production of quality seed and its safe storage. The strategies for conservation of millets involved seed collection, multiplication, seed distribution and farmer-to-farmer exchanges mediated by the seed banks. The seed banks were built on traditional practices. MSSRF motivated the revival of traditional seed-storage practices, such as the use of thombai, a traditional grain storage structure that varies in size from a small compartment within a house to a separate hut-like structure nearby. These structures are 5–8cm above the ground to prevent damage by rats. Generally, they consist of two compartments with a small opening at the top. Women usually manage these structures and use dried leaves as a pest repellent. In addition, MSSRF facilitated the construction of new structures using local manual labour (King et al., 2009).

## **Governance and management**

These revitalized and newly constructed seed banks are managed by the local communities. Over the last decade, MSSRF facilitated the establishment of community seed banks in 15 villages that now have their own safe seed storage and an institutional system for regular seed production, distribution and exchange.

New institutions, such as self-help groups consisting of 10–15 women and men farmers, have been organized to manage the seed banks. These groups are primarily credit-based institutions that are recognized by the formal banking

system. Two women or men chosen from the group serve as seed bank managers. Based on local preferences, the required quantity of preferred varieties of seed is mobilized. Transactions are guided by local ethics and norms, such as:

- The borrower has to return one and a half or two times the quantity of seed borrowed.
- Transactions consist of the exchange of seeds, never cash.
- Seed has to be returned; otherwise, borrowers will not be able to use the seed bank again.
- If the seed is not returned after harvest in the same year, the interest rate doubles.
- The lender ensures good seed quality and trusts 'neighbourhood certification'.
- If the quality of the seed is poor, e.g. it contains inert dust particles and chaff, the lender cleans it before the transaction.

### **Technical issues**

MSSRF provides training and capacity building periodically for both men and women; the training focusses mainly on seed quality, monitoring, storage and management. Community seed bank operations are largely dependent on an optimal level of literacy and require valuable time for monitoring; thus, seed exchange is difficult at times (King et al., 2009). This problem was resolved through training, especially in maintenance of records, receipts, interest on seed loans, etc.

The seed bank managers ensure the germination and physical purity of the seed material loaned and returned. They also constantly monitor the seed stock for pests. The availability of the seed stock in the bank and the balance sheet are discussed at monthly group meetings. The self-help group members share information on available varieties and quantities informally with neighbouring farmers. To allow greater outreach, seed bank managers participate in annual temple festivals, seed bank fairs and state-sponsored exhibitions.

### **Evolution to village millet resource centres**

For over a decade now, the MSSRF has been promoting an integrated approach to reviving, conserving and enhancing the sustainable use of crop genetic resources, especially indigenous ones (King et al., 2009). It has supported community seed banks and managing institutions in implementing a 'four Cs framework': conservation, cultivation, consumption and commercialization. In 15 locations, community seed banks have evolved into village millet resource centres (VMRCs), where the local managing groups provide information support. Practices involved in the four Cs framework for sustaining seed banks are described below.

### ***Participatory quality seed production and selection of better varieties***

Community seed bank facilitators have been trained in the importance of weeding and thinning plants, identifying seeds, dealing with pest and disease infestation and postharvest processing, such as drying and safe storage. To promote millet production and broaden local genetic diversity, MSSRF accessed a few hundred accessions of three millet species from the germplasm bank of the International Crops Research Institute for the Semi-arid Tropics in Hyderabad and improved cultivars developed under a national programme from the All India Small Millet Coordinated Research Programme, Bangalore. At some seed banks, these were grown repeatedly and varieties that were better than the local landraces were selected by farmers (King et al., 2013a). In these experiments, farmers identified three varieties from among improved varieties as well as local landraces with yields 20–30 per cent higher than those under cultivation.

### ***Increasing yield by improving cultivation practices***

The availability of quality seed substantially contributed to the promotion of millet cultivation. However, compared with alternative crops, such as tapioca and pineapple, millet yield and the income from its production were poor. Thus, increased productivity was essential to maintain millet as a viable crop option. Together with the self-help groups, the MSSRF initiated agronomic measures such as row planting, reduced seeding rates, application of farmyard manure and intercropping millet with tapioca. These practices were able to increase the yield, and thus the economic return, of finger millet by 39 per cent, of little millet by 37 per cent and of foxtail millet by 30 per cent (King et al., 2013b). This result convinced farmers who are associated with the community seed banks to increase cultivation of millets using the improved practices.

### ***Introducing drudgery-free grain processing technology***

One of the important reasons for decreasing interest in millet cultivation and use was the hard work associated with its processing. All millets except finger millet have a hard seed coat requiring strong abrasive forces to extract the grain. Decortication had been accomplished using a mortar and pestle – a tedious and physically taxing process almost exclusively done by women. No suitable machinery was available to reduce this drudgery. The introduction by MSSRF of small mechanical milling facilities in the VMRCs signaled a major change for the women and contributed substantially to revival of interest in millet cultivation and consumption. Currently, pulverizers and dehulling mills are managed by VMRCs in nine settlements. A collaborative project with the University of Agricultural Sciences, Dharwad, and McGill University, Canada, which was supported by the Canadian International Food Security Research Fund and the International Development Research Centre, has resulted in new prototype machinery for processing little millets with a recovery efficiency of 90–95 per cent (Dolli et al., 2013). Further research is ongoing to customize

this machinery for other small millets. Another important spinoff from the mechanization of millet processing was local interest, particularly among women, in building a value chain for millets.

### ***Developing and promoting new marketable millet products***

Building a value chain for millets required specialized training in product development, maintaining product quality and consistency, packaging, labelling and marketing. Selected members of VMRCs were trained in these areas at the Rural Home Science Colleges under Avinashilingam University, Coimbatore, and also at the agricultural universities at Bangalore and Dharwad (Vijayalakshmi et al., 2010; Yenagi et al., 2010; Bergamini et al., 2013). This training, which was planned and supported by the MSSRF, has empowered village women in terms of the production of all value-added items such as malt, rava and ready-made mixes of millets. Products with good commercial potential were identified through market studies and put into production through the collective work of the self-help groups. Different groups were encouraged to specialize in the production of different products (Plate 9). During the early stages of production and marketing, MSSRF assistance was extended in the form of further training in product quality, packaging, labelling, marketing and account keeping.

### ***Establishing a market for value-added millet products***

Although farmers had experience in selling their primary produce, they lacked the ability to market value-added products. Thus, MSSRF was required to provide assistance to the self-help groups in marketing the products in urban areas. This was done through a combination of approaches, including promotion campaigns, awareness raising and lobbying for policy changes. Slowly, members of the self-help groups with marketing skills were identified and promoted to undertake product marketing with local retail outlets. With help, they also established a retail outlet for all products in Kolli Hills under the banner Kolli Hills Agro Biodiversity Conservers' Federation (KHABCoFED) (Assis et al., 2010; King, 2012). Millet products branded 'Kolli Hills Natural Products' are available in natural food stores in 25 towns in Tamil Nadu. The most popular and best-selling millet products are ready-made mixes, milled rice of little millet and Italian millet and finger millet malt. Since 2001, the KHABCoFED has sold 9t of whole grain, 23.3t of little millet, rava and flour, 7.4t of value-added products for a total value of 15.2 lakh rupees (about US\$2,500).

### ***Establishing community institutions for the promotion of millets***

MSSRF organized local farm women and men, who were interested in the cultivation of millets, into self-help groups and farmers' clubs. The self-help groups were encouraged to build collective savings from their income and lend money within the group; they are often linked with local banking services.

They were also trained and supported in collective activities, such as promotion of millet cultivation. MSSRF has facilitated training for 43 self-help groups and 29 farmers' clubs in the Kolli Hills, which include over 943 members (of which 420 are women). Among these, 47 groups (365 men and 247 women) are involved in the institutionalization of various operations to conserve, cultivate and market millets. Specific self-help groups or individual members are delegated to undertake specific activities according to their interest, such as improved production, variety selection, management of millet processing units, grain procurement and transportation to processing centres, building the value chain, etc. These self-help groups have been confederated under the KHABCoFED.

### **Costs and sustainability of VMRCs**

A decade of participatory research and development efforts has enabled farm families to access and manage diverse local genetic materials all year through community seed banks and seed exchange networks. Communities have also been enabled to make their own choices of varieties based on local weather conditions. Millet production and yield have been increased through the selection of adapted varieties, use of high-quality seed and improved agronomic practices. Interventions to increase production and improve agronomic techniques have helped to increase yields and income and enlarge the food diversity basket. Millet processing machinery has reduced the drudgery associated with processing millet and improved food quality. Millet processing technologies, the development of new millet uses and linking products to markets through awareness and promotion campaigns have increased the use of millets. The value-chain interventions revolving around VMRCs have generated employment and income for millet producers and other actors in the chain. Community institutions built around these actions (self-help groups and farmers' clubs) have been able to promote their value-added products as they have improved access to suitable markets for millets. Enhanced local use and marketing opportunities have increased consumption of millets.

Furthermore, innovative practices developed in the process of networking community seed banks and recognition of custodian farmers and their enhanced role in the cultivation, processing, marketing of the underused and neglected millets have sustained community seed banks and have potential for larger replication in similar agro-ecologies.

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